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The Relationship between Stress Urinary Incontinence in Women and Flat Foot by Using Two Methods

[1]Maede Ansarian, [2]Maghsoud Eivazi Gharamaleki, [3]Fariba Ghaderi, [4]Mohammad Ebrahim Ghafari, [5]Neda Asaadi

[1]Department of Rehabilitation, School of Public Health, Tabriz University of Medical Science, Tabriz, Iran.
[2]Rehabilitation Faculty, Rehabilitation Tabriz University of Medical Sciences, Tabriz, Iran.
[3]Rehabilitation Faculty, Rehabilitation Tabriz University of Medical Sciences, Tabriz, Iran.
[4]Department of Epidemiology & Biostatistics, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran.
[5]Department of, School of Public Health, Tabriz University of Medical Science, Tabriz, Iran.

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ABSTRACT

Introduction: The aim of this study is to investigate existence of relationship between flat foot and stress urinary incontinence. Also, an association between diagnose of flat foot via measurement of height of medial length arch by Metrecom and through scaling with Foot Posture Index (FPI - 6) has been observed. Methods: 28 stress urinary incontinence female and 57 urinary continence female participated in this study. The level of navicular tuberosity displacement in those individuals was measured by using Metrecom in two position of standing and then siting. It was scored through observation of congruence in foot medial length arch, based on Foot Posture Index 6 (FPI-6) scale laying. Results: There was no significant relationship between right flat foot by method of Metrecom and stress urinary incontinence in women (P = 0.071) and also, right flat foot by method of observing FPI-6 and stress urinary incontinence in women (P = 0.486), and correlation between flat foot diagnose through both methods of observation and Metrecom was 0.014. Conclusion: The results of this study revealed that flat foot could not be a risk factor to stress urinary incontinence. This may be caused by smallness of foot changes effect on pelvic floor mechanism and occurrence of compensatory mechanisms in kinematic chain of distal limbs pelvic girdle. A significant correlation between flat feet diagnoses, through two methods of scale laying with FPI – 6 by observation and Metrecom was available.

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INTRODUCTION

Women suffering from pelvic floor disorder, both physically and affectionately suffer from disorders in their personal and social life. In Iran, nearly %38.4 to %89 of studied women in different cities suffer from pelvic floor disorders [1,2]. Factors like internal surgery, presence of osteoarthritis, chronic coughs, rupture during delivery and lack of physical training are considered risk factors in the domain of increased incontinence [1]. One woman out of each nine ones in America goes under surgery during her lifetime because of pelvic floor disorder among which %30 6would need re surgery. It is predicted that in coming 30 years, need for treatments will increase at least %45 [3]. One of the reasons for urinary incontinence is disability of pelvic floor muscles to proper resisting against increased intra-abdominal pressure. The issue may be caused from damaged neuromuscular, fascia trauma and or change in motor control [4]. First line to treatment of urinary incontinence includes pelvic floor exercises, (muscular contractions of pelvic floor) and changing individuals' behavioral patterns [5]. In the present time, there are some surgical and medicinal treatments for stress urinary incontinence; physiotherapy is considered as primary treatment because of inexpensiveness and having less risks [6].

Fozzatti et al. concluded that using methods of general postural re-training is another effective method to treatment of women with urinary incontinence. The issue shows a relationship between urinary incontinence in this group of women with pelvic and lumbar disorder and insufficient distribution of inter abdominal pressure in this area and low back pain [7]. Others acknowledge that, distal organs' alignment can change pelvic girdle through powers imposed via feet. In fact the reaction between foot and pelvic occurs at reactive behavior kinematic state and it is recommended to treatment agents that they should notice alignment too in considering

Corresponding Author: Maghsoud Eivazi Gharamaleki, Rehabilitation Faculty, Rehabilitation Tabriz University of Medical Sciences, Tabriz, Iran.
E-mail: bmaghsoud@gmail.com

lumbar and pelvis disorder [8]. Different position's impact of feet on pelvic floor muscles' activities have been specified by some researchers. Individuals have maximum activity of pelvic floor muscles, in standing position with dorsiflexion and have minimum rate of activity in position of plantar flection. This issue is on important factor combined with exercise therapy in stress urinary incontinence [9]. In feet active positions, rate of pelvic floor muscles activity in more than passive positions; and maximum activity pelvic floor muscle was recorded in active plantar flexion by raising hands [10].

Nygaard et al. found a meaningful relationship between decrease in foot flexibility and urinary incontinence. According to Veloshin et al. whenever feet touch the earth, soft tissue distributes a contact shock to protect pelvis, abdomen, thoracic and cranial content, from undesired effects and walking frequently. Nygaard believes that most of energy should be absorbed by feet that will have more changes in arch's height along middle standing (an stage in gait that midfoot on the ground). Thus a less force is conveyed to pelvic floor and finally, urinary continence substitute with incontinence clinically [11]. The aim of study is to investigate existence of relationship between flat foot as one of the most important foot disorder and stress urinary incontinence.

MATERIALS AND METHODS

Subjects and Methods:

Subjects were 99 women that after getting informed of study's conditions and it's aim participated in this study by filling in content form. Has been referred to Tabriz city' s Alzahra hospital to stress urinary incontinence by diagnose of a gynecologist; were asked; " Whether they have had an experience of leaking urine by coughing, sneezing, laughing or picking a heavy thing during their activities?" [12]; They responded "Yes". They then entered the group of stress urinary incontinence. Method of sampling was in access sampling. Exclude criteria the study were: Having history of delivery by forceps and vacuum, diabetes, hypermobility syndrome, records of any surgery in pelvis and abdominal region, abortion, close of uterus tubule, records of any trauma or surgery in pelvis and distal limbs, congenital bone deformities, consuming urine incontinence drugs, history of lung diseases associated with chronic coughs, record of executing sport with treadmill or jumping sports, existence of any pelvic mass like uterus myoma, more than two time natural delivery, menopause, smoking cigarettes, consuming anti depressive drugs and osteoporosis. Control group consisted of individuals randomly referred to clinic. All of the participants have given an informed written consent and the study protocol was approved by the Ethics Committee of Tabriz University of Medical Sciences (TUMS) which was in compliance with the Helsinki declaration. They were consistent with our studying group from the view of age and Body Mass Index (BMI). Exclude criteria the study was in addition to mentioned cases was to respond "Yes" to the above question. None of participants were sport women. Fifteen women exited the results analysis because of having fibroma and more than two times delivery. Twenty eight women with stress urinary incontinence and fifty seven ones with urinary continence, with age between 17 to 47 years (average 31.12 years and standard deviation 7.60), average length of 1.58 meter (standard deviation 0.058 m), average weight of 67.74 kg (standard deviation 11.08 kg) and BMI 26.14 $^{kg}/_{m^2}$ (standard deviation 4.79), were present.

Data was gathered through asking and registering the individuals' information via measurement by Metrecom device and scoring by observation. Two methods were used to investigate flat foot. First method was based on scoring by observation [13], that height and congruency of foot medial length arch was observed. If arch height was normal and concentrically curved; number "0" was considered; if arch lowered with some flattening in the central portion; number "1" was allocated, if arch very low with severe flattening in the central portion arch making ground contact, number "2"; if the arch moderately high and slightly acute posteriorly, number "–1"; and if arch high and acutely angled towards the posterior end of medial arch, number "–2" was allocated. Number "0" is normal arch and numbers "1&2" show flat foot.

Second method is based on level of displacement of navicular tuberosity [14-16], that was measured by mechanical Metrecom device (Guangula, made in China) by 0.01 cm. accuracy (image 1).

Fig. 1:

Individuals stand on a flat surface with looking to front, distributing weight on both feet equally, and feet depart from each other with a comfort distance. Examiner scores to foot medial longitudinal arch.

In the first stage, in sitting on chair position, feet non weight bearing, the height of navicular tuberosity was measured. In second stage, in standing position and retouching navicular tuberosity the height was measured. The operations iterated for two times. The difference of those two distances, is between 6-9 mm. naturally [14,15]. Displacement more than 10 mm. is considered flat foot [17].

To minimize error, Metrecom 's probe must have located below navicular tuberosity , and then displaces toward up, till it reaches the point under navicular tuberosity. By changing position into standing, retouching should have occurred. Individual were requested to settle on elevated platform to reduce level of vision errors. In this way the examiner investigate the level of navicular tuberosity displacement at the frontal view, with more accuracy. In this study, reliability of Metrecom device was evaluated for measuring level of navicular tuberosity displacement before test starts. Measurements has been iterated in all cases for two times and considered average of two value gained [15].

Data analysis:

Achieved data from the study was investigated and analyzed statistically by using statistical – descriptive methods (abundance percent and average ± standard deviation) of t test, far average difference in independent groups, about quantitative variables (stress urinary incontinence and displacement level of navicular tuberosity) and accurate exam of Fisher for qualitative variables (stress urinary incontinence and flat foot observation) by using statistical software SPSS version18.

In this study p value was considered less than 0.05 which was statistically significant. Normal distribution was calculated by using Kolmogorov–Smirnov test. To determine Intratester reliability, level of fall in navicular tuberosity, the standard of Intratester Correlation Coefficient (ICC) was used. The rate of standard error was calculated. Method of sampling was in – access sampling, which were selected among referred individuals to Tabriz Alzahra hospital having the conditions to study. For control group via summon, individuals were selected that had referred to clinic voluntarily and were consistent with our study group from the view of age and BMI. With respect to not finding of any study similar to present study in the results of searching articles and electronic resources; to achieve abundance of flat foot ratio in women group with urinary incontinence, the result from pilot study were used. About 20 women with urinary incontinence were studied. That %70 women with urinary incontinence and %40 of women with urinary continence had flat foot. Next, resultant of flat foot ratio in this group, sample size with power of 80 percent and maximum first type error 0.05 and acceptable difference of final sample size, were calculated by using formula of two ratios resultant.

$$n = \frac{\left\{ z_{1-\frac{\alpha}{2}} \sqrt{2\bar{p}(1-\bar{p})} + z_{1-\beta} \sqrt{p_1(1-p_1) + p_2(1-p_2)} \right\}^2}{(p_1 - p_2)^2}$$

$$\bar{p} = \frac{p_1 + p_2}{2}$$

And that's result was about 13 people in each group. In this study 99 people were evaluated.

Results:

In this study first, reliability of Metrecom device used in this research took place by considering 10 subjects as pilot study and two measurements with time interval of 3 hours took place. Resulted data were achieved by using Intratester analyzed and that's results for Metrecom gained (p = 0.993), that was not significant and the

data had no significant difference in both measurements. Therefore that measurement is valid. From the other side, measurement in right foot conditioned weight bearing and none weight bearing took place two times. By using Pearson consolidation exam was achieved to be p>0.05 and data in both times of measurement have no significant difference and measurement is reliable. Then average of two measurements was applied in analyses.

Specifications of participant individuals:

In the present study, two groups of women with stress urinary incontinence and urinary continence, having conditions to enter the study were evaluated. Studied subjects were 28 women (%32.9) with stress urinary incontinence and 57 ones (%67.1) with urinary continence. None of the individuals under study, were athletes and they were match the view of the age and BMI. Complete specifications of these people are available in table (1). Individuals ' specifications were compared by using independent- samples T test. Both groups had no significant difference in all case.

Table 1: Specifications of participant individuals

Groups	Number& percent	Age (year)	Height (meter)	Weight (kilogram)	BMI (kg/m^2)
urinary continence	57 (%67.1)	30.31	1.58	64.82	25.93
Stress urinary incontinence	28 (%32.9)	32.78	1.59	67.60	26.58
P value	-	0.161	0.478	0.279	0.558

Marital status of women's two groups is brought in table (2), %79.4 of individuals that participated were married. By using Fisher's exact test, the conditions of marriage were investigated in two groups showing that there was no significant relationship in two groups (p = 0.377).

Table 2: Marital status of women' s two groups

Groups	Marital status		
	Single (number & percent)	Married (number & percent)	total
Urinary continence	7 (%12.3)	50 (%87.7)	57
Stress urinary incontinence	2 (%7.1)	26 (%92.9)	28
total	9 (%10.6)	76 (%79.4)	85

Compare of flat foot via scaling by observation in two groups:

By using FPI-6 scaling on congruency of individuals' medial longitudinal arch of foot via observing the arch in standing position and equal weight cast on both feet, were scored.

Since data had no significant difference in all case in both right and left foot of individuals using Pearson's consolidation, the analysis of individuals' right side data is mentioned.

Results of both groups using X^2 test in table (3) are given.

Table 3: giving scores to right medial longitudinal arch of foot based on FPI-6 scaling

Groups	giving scores to right medial longitudinal arch of foot based on FPI-6 scaling					
	-2	-1	0	1	2	l
Urinary continence	1 (%1.8)	2 (%3.5)	11 (%19.3)	27 (%47.4)	16 (%28)	
Stress urinary incontinence	0 (%0)	1 (%3.6)	4 (%14.3)	12 (%42.9)	11 (%39.3	
total	1 (%1.2)	3 (%3.5)	15 (%17.6)	39 (%45.9)	27 (%31.8	

arch height normal and concentrically curved "0";
arch lowered with some flattening in the central portion "1";
arch very low with severe flattening in the central portion arch making ground contact "2";
arch moderately high and slightly acute posteriorly "–1";
arch high and acutely angled towards the posterior end of medial arch "–2"

If individuals having scores 1 and 2 in flat foot group and individuals having 0, -1, -2 in none flat foot group, by using X^2 test, results are given at diagram (1).

Meaning that there is no significant difference for observing flat foot in both groups of women with urinary continence and with stress urinary incontinence (p=0.486).

Results show that 66 people out of 85 ones have flat foot that incudes %77.6.

In next stage, if individuals with score 2 located in individuals with severe flat foot, and rest of samples located in group without severe flat foot; by considering results given at diagram (2) with X^2 test. There is no significant difference in both groups of incontinence and continence urinary for severe flat foot (p = 0.297).

Twenty seven ones had severe flat foot. That it included %31.8 of participants totally.

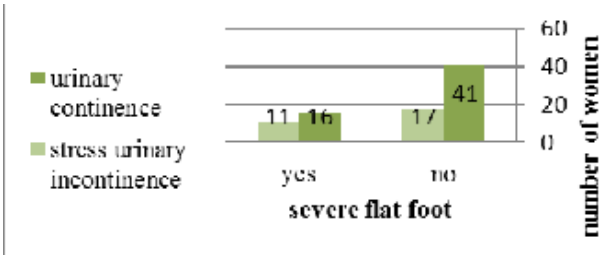

Diagram 2: severe flat foot of right foot by scaling with observation in two groups

Compare of flat foot via Metrecom in two groups:

In this study, method of measuring navicular tuberosity height in two positions, with none weight bearing and weight bearing, was used for flat foot. If difference between these two heights, was more than 10 mm. was located at flat foot group. This height difference in both groups was compared to each other, data of right foot are given at table (4) that was not significant. Average height difference in navicular tuberosity had no significant difference in both two groups (p = 0.071).

Table4: average of height difference of navicular tuberosity in two groups

Groups	Number of women in each group	Average height difference (cm.)	P_{value}
Urinary continence	57 (%67.1)	0.90	0.071
Stress urinary incontinence	28 (%32.9)	0.71	
total	85	0.84	

If the difference is more than 10 mm. of navicular tuberosity, they will be considered as flat foot group. And if it was less than 10 mm. were of none flat foot group. Results were investigated by X^2 test. Data in diagram (3) are as following: the relationship is not significant; meaning that flat foot in both groups had no significant difference (p = 0.214).

Presence of flat foot was confirmed by Metrecom method in 29 individuals, that is, %34.1 of participants.

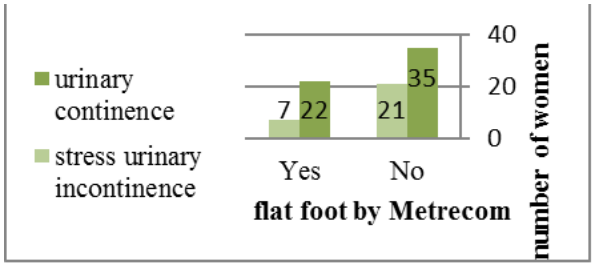

Diagram 3: flat foot of right foot by Metrecom if difference height is more than 10mm. in two groups

Correlation between Metrecom and scaling by observation methods for flat foot:

In this study has been investigated the correlation between two methods of observation and Metrecom for diagnose of flat foot, by using Spearman's correlation test. Significant correlation was seen for flat foot either slight or sever by observation and Metrecom methods (P = 0.014). However, there is not a significant association between scaling observation and Metrecom methods flat foot severe one (p=0.386).

Height of navicular tuberosity at two positions of weight bearing and none weight bearing:

In diagram (4), average height of navicular tuberosity at two positions of weight bearing and none weight bearing are mentioned through observation for right foot arch, by using independent- sample T test.

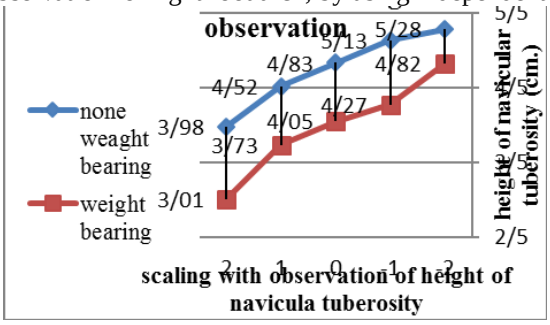

Diagram 4: height of navicular tuberositu in each scaling with observation

Average height of tuberosity in all participants with normal arch was 4.83 cm. in none weight bearing position and 4.05 cm. for weight bearing position.

Comparison of average height of navicular tuberosity by independent- sample T test in both groups at two positions in diagram (5) showed that, tuberosity height in urinary incontinence women at position none weight bearing, is less than women with urinary continence. In another words, height of navicular tuberosity in stress urinary incontinence group has decline compared to urinary continence group. Group with stress urinary incontinence 4.28 and urinary continence 4.51 cm.; in position of weight bearing, level of tuberosity difference of navicular bone is less in under research and control groups. (3.60 cm. in group of with urinary continence and 3. 56 cm. for stress urinary incontinence).

Tuberosity height difference in two positions of none weight bearing and weight bearing was not significant in both groups of women.

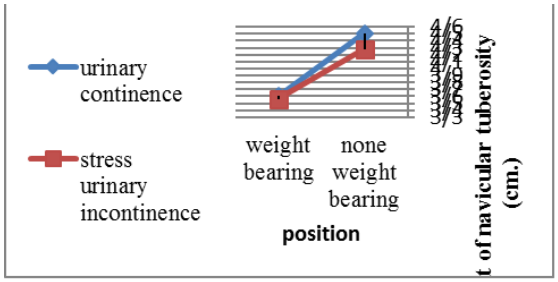

Diagram 5: compration of height of navicular tuberositu in two position in two groups

Discussion:

Results of this study revealed that there was significant correlation between flat foot diagnose through scaling by observation and flat foot diagnose through Metrecom. There was no significant difference between number of individuals with flat foot through scaling by observation and through Metrecom in both groups of urinary continence and stress urinary incontinence. In this sample of 85 ones, 66 individuals had flat foot, that is %77.6, out of this number, 27 ones had severe flat foot, meaning %31.7 of total participants. This is of importance that outbreak of flat foot in this society of women is more than statistics mentioned. So as in some studies, prevalence of level of flat foot in children and adults is estimated to be %5 [18]. It is likely that high presence of flat foot in two groups of participants may be an effective factor in none significant of difference between two groups. In some studies, impact of foot position on more proximal parts of body is investigated, that greater intermediations were applied. In some cases these impacts were not significant on pelvis and lumbar. It is possible that results meaningless in present study is also for small changes in medial longitudinal arch's drop, and consequently small effects on pelvic floor's mechanism. From the other side complex changes of foot in kinematic chain of distal limbs till pelvic girdle could be influenced by compensatory mechanisms and it's adverse effects may be neutralized to on extent. Khamis et al. have investigated the effect of hyper pronation of foot on pelvis and distal limbs at four positions of standing with neutral ankle on earth, 10, 15 and 20 degree of pronation. Results demonstrated that there is a significant difference between foot hyper pronation with leg 's internal rotation, thigh internal rotation and anterior tilt of pelvis bone [8], that in this study, effect of hyper pronation is great. Duval et al. in their study considered effects of eversion and inversion calcaneus on lumbar lordosis and pelvic tilt with 5,10 and 15 degree. Results showed that eversion and inversion calcaneal on pelvic tilt and lumbar lordosis have not a significant effect [19]. Bendix et al. considered the relationship between change in ankle height of lumbar lordosis and pelvic tilt. They put on shoes with + 4.5, 0 and – 2.5 heels. By increasing the heel height, lumbar curve increased and pelvic tilt decrease [20]. In another study, excessive foot pronation has been known as the factor to develop deviation in pelvis and chondromalacia [21]. Barwich et al. in a study reviewed the relationship between foot movements specially excessive foot pronation and it' s effect on distal limbs and lumbar and also sufficient foot functional ostosis. Abnormal foot function specially it's excessive pronation is a risk factor in damage of distal limbs overuse, that includes lumbar, hip, knee, leg and ankle. In theory of increased pronation, it is accompanied with femur and tibia internal rotation and knee valgus and pelvis anterior tilt, that this position increases pressure on concerning musculoskeletal structures and causes overuse damage through micro trauma that occurs frequently in gait cycle. Abnormal pronation results in midfoot destruction and strait on the arch's supportive tissues like plantaris fascia will increase. In static phase, abnormal pronation results in instability of forefoot and as a result, propulsive phase will become idle because of disorder in first joint of metatarsophalangeal which in turn cause change in gate pattern restriction of hallux. These factor cause change in gait pattern with excessive inversion forefoot, instability of propulsive phase and postural perturbation of changing pattern in putting the weight on feet. Tibia's internal rotation position results in patella's lateral location on femur and patellofemoral pain syndrome. In changing position of pelvis to

anterior, strain on pelvic muscles and hip includes iliopsoas, piriformis and gluteus. After that the sciatic great foramen narrows and sciatic nerve may be pressed. Also pelvis anterior rotation causes disc in plane sagittal to become wedge formed. From the other side foot's increased pronation causes strain on lumbosacral. In women because of wider pelvis and femur's more valgus angle and hip's more internal rotation compared to similar men, risk of damage in distal limbs will be more [22].

Mika et al. in their study investigated effect of short heel (4cm.) and long heel (10cm.) and shoeless on time specifications of electromyography of muscles: erector spine, gluteus medius and biceps femoris. Most of findings concerning the study show that, during of high heel shoes, pattern to activity of hip extensor and lumbar muscles changes. Hip extensor muscles include hamstring and gluteus muscles as lumbopelvic stable during lumbopelvic rhythm. Putting on high heel shoes, according to the results from this study causes change in coordination of neuromuscular and posture [23]. Pinto et al. by using wedge of 10 degree, investigated the effect of calcaneus increased eversion in three experiments of: without wedge, with one wedge at right foot and wedge on both feet, by using motion analyzer considered the pelvic movement in sagittal and frontal discs. Results showed that one-way and two-way increase of calcaneus eversion cause little but meaningful changes in pelvis. So as the two sided eversion causes anteversion of pelvis and one sided eversion causes lateral tilt of pelvis. According to Botte, hip's inward rotation may cause tension to iliopsoas muscle, and also to capsular ligament of this joint, and finally will cause postural changes in one- side calcaneal eversion, lateral tilt is generated and results in shortness of limbs' s functionality. According to Gurney and Aebi calcaneal one sided eversion causes lateral tilt of sacrum base and lumbar scoliosis. Pelvis position also is depended on anatomical factors such as alignment of joints of distal limbs during activities with closed chain [24]. Islami investigated the effects of 4 wedge in anterior, posterior, medial, lateral of the foot on subtalar joint, ankle, knee, hip, pelvis and trunk; wedges by their change's angle during standing on one foot. it's results showed that in each of four wedges, the mentioned joints' location angle in their movement disc has changed, compared to position without wedge [25].

Betsch et al. in their study investigated the effects of foot's different position on pelvis and spinal column positions. Foot positions included increased medial and lateral foot, and positive and negative heel height with 5, 10 and 15 mm. changes. More changes up to 40 mm. also was possible but was uncomfortable to individuals. Results showed that there was a significant relationship between heel height change and increased lateral foot and pelvic tilt changes. But there was no significant correlation between foot positions changes and spine posture. An explanation to foot positions changes cannot make a significant change in spine can be because of smallness of foot positions changes. In addition their focus is on fast effects of foot positions changes on spine position. It's long term effects has not cleared yet. Also it is possible that distal limbs and pelvic girdle's kinematic chain compensate a certain amount of changes. Therefore in this study no changes in spine is observed [26]. Nakhaee et al. in their study investigated the correlation between foot's medial longitudinal arch' height and rate of damages to ankle and knee in professional runners. Results showed that, there is no relationship between rate of damage to knee and ankle and height of foot's medial longitudinal arch [17].

In this study, there was no significant relationship between flat foot through Metrecom and stress urinary incontinence ($p = 0.071$), which available in results of decline in height of navicular tuberosity in women with stress urinary incontinence compared to women urinary continence. But this difference was not significant; meaning that in group of individuals with urinary continence at position of none weight bearing 4.51 mm., and in the group with stress urinary incontinence 4.28 mm., and level at position weight bearing in order 3.60 and 3.56 mm.; to be assure of none accidentally of this finding, it must be evaluated in more persons. With regard to the point that, in this study no relationship was found between flat foot and stress urinary incontinence, but a significant association was seen in several studies between low back pain and feet abnormal position. Bird et al. have investigated effect of feet wedges on electromyography activity of erector spinae, gluteus medius muscles during walking. Role of feet's biomechanics influences generation of low back pain in special way. So as using feet's orthosis is the modality to treat abnormal biomechanical change in distal limbs association with LBP. feet's abnormal pronation leads to generation of internal rotation and a pelvis lateral anterior tilt in a one- sided form that, this may cause increase of strain on some pelvis muscle such as iliopsoas, piriformis and gluteus. And finally causes lumbar rotation towards pelvic anterior and results in change in lumbar dynamic forces during walking. To reduce tension on iliopsoas bachward through erector spinae muscles causes muscle fatigueness. It is specified consequently that way feet's abnormal function leads to generate LBP and why it is effective to prescribe orthosis [27]. In some studies the LBP, Lumbar and pelvis position and their effects on activities in pelvic floor muscles are investigate. Sapsford et al. found that sitting different positions are effective on pelvic floor muscles activities [28]. Capson et al. found that, in standing position, level of activities of pelvic floor muscles resting position was higher in hypolordotic posture compared to natural and hyperlordotic posture [29]. In both sexes, sacrum' s posterior rotation leads to increased tension in pelvic floor muscles [30]. Nguyen et al. found that in women with advanced urethra vaginal prolapse, lumbar lordosis is less and their pelvic inlet was less in vertical position compared to women without prolapse [31]. Based on finding of Mattox et al. there is a relationship between spine column curve, means kyphosis of thoracic area and reduced lordosis in lumbar area.

This issue causes severity in pelvic organs prolapse. Based on these people' finding, there is an association between abnormal curve increase in spine column and prolapse stages [32]. Of reasons to meaninglessness of correlation between flat foot and stress urinary incontinence in women, we can name inequality of distribution to number of vaginal deliveries between two groups of women. So as the number of vaginal deliveries is more in stress urinary incontinence group. One of study' limitation was high prevalence of cesarean surgery in women's sample. Due to outbreak of flat foot in woman' sample, perhaps can achieve a significant results by increased sample size.

Conclusion:

There is consolidation between flat foot diagnosis through observation with FPI-6 scaling and through Metrecom methods. There was no significant difference between number of individuals with flat foot among two groups of stress urinary incontinence and urinary continence women. It is suggested that in future studies, individuals with urinary incontinence and foot pronation; the intensity of urinary incontinence is specified, till posed in comparison with control group that similar individuals have conditions to urinary incontinence and normal feet. In under study group, appropriate orthosis must be prescribed and urinary incontinence intensity should be investigated after six months, whether this has had on impact on level of intensity to urinary incontinence or not.

Number of sample size can be increased in future studies. In this study, although number of vaginal deliveries was not more than two, but it's distribution on both groups had a significant difference. Number of deliveries in woman with stress urinary incontinence was more. This note must be under attention in performing other studies.

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